

UNITED STATES DISTRICT COURT
DISTRICT OF NEW JERSEY
CAMDEN VICINAGE

IN RE : : MASTER DOCKET NO.:
PAULSBORO DERAILMENT CASES : : 13-CV-784 (RBK/KMW)

ALICE BREEMAN *et al.*, :
Plaintiff, : CASE NO. 1:12-cv-7468 (RBK/KMW)
vs. :
CONSOLIDATED RAIL :
CORPORATION, *et al.*, :
Defendants. :

**DEFENDANTS CONSOLIDATED RAIL CORPORATION, NORFOLK SOUTHERN
RAILWAY COMPANY AND CSX TRANSPORTATION, INC.'S MEMORANDUM IN
OPPOSITION TO PLAINTIFF'S MOTION TO EXCLUDE THE EXPERT REPORT
AND OPINIONS OF DEFENDANTS' EXPERTS SCHULMAN AND DESAUTELS**

Filed on behalf of Defendants,
Consolidated Rail Corporation,
Norfolk Southern Railway Company,
and CSX Transportation, Inc.

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SCHULMAN AND DESAUTELS**

NOW COME Defendants, Consolidated Rail Corporation, Norfolk Southern Railway Company and CSX Transportation, Inc. (“Defendants”), by and through their counsel, Burns White LLC, and submit this Memorandum of Law in Opposition to Plaintiff’s Motion to Exclude the Expert Report and Opinions of Defendants’ Experts Schulman and DesAutels.

I. PRELIMINARY STATEMENT

Plaintiff has filed a challenge to the opinions offered in the April 20, 2015 report of Defendants' experts Lloyd L. Schulman, Ph.D. and Christopher G. DesAutels, of Exponent, Inc.

The opinions offered by Schulman and DesAutels with respect to air modeling of the vinyl chloride release, as well as their opinions offered in rebuttal of Plaintiff's expert Dr. Georgopolous' air modeling methodology, are entirely proper. Schulman and DesAutels' opinions are not only reliable, but they amply fit the claim to be tried here, and will be manifestly helpful to the jury.

Under the pretext of filing a challenge to the opinions of Defendants' experts, Plaintiff has instead filed what amounts to further, improper supplementation of the report and opinions of her own modeling expert, Panos Georgopolous, Ph.D. As noted by Defendants in their Reply to Plaintiffs' Response to Defendants' challenge to Dr. Georgopolous, Plaintiff's untimely attempts to cure the deficiencies of Dr. Georgopolous' opinions are evidenced by the fact that in her motion papers, Plaintiff includes a declaration of Dr. Georgopolous- the very same declaration appended to the Response to Defendants' Motion to Exclude Dr. Georgopolous- inappropriately injecting new grounds to support his opinions in this matter.¹ However, because Dr. Georgopolous' declaration is essentially a supplemental expert report submitted in contravention of the rules, it must be disregarded.

Plaintiff also asserts haphazard arguments against Defendants' experts that are utterly lacking in scientific support. However, Defendants have asserted a significant and well-documented challenge to Dr. Georgopolous' qualifications, methodology, and the reliability of his opinions under *Daubert*. In contrast, Plaintiff's objections to Defense Experts Schulman and DesAutels' opinions are wholly devoid of substance. Plaintiff contends that Schulman and DesAutels should not be permitted to provide the jury with their opinions with regard to air modeling of the vinyl

¹ On May 22, 2015, Defendants filed a Motion to Exclude Dr. Georgopolous on the Master Docket, and in the cases of *Breeman, Lord, Everingham, Morris, Johnson, Truluck, and Smith*. On June 19, 2015, Plaintiffs filed an Opposition to Defendants' Motion to Exclude Dr. Georgopolous on the Master Docket only, although Plaintiffs' Motion and Brief are captioned with the cases of *Breeman, Lord, Everingham, Morris, Johnson, Truluck, and Smith*. Plaintiff Breeman only has now filed this motion to exclude defense experts Schulman and DesAutels.

chloride dispersion following the November 30, 2012 derailment in Paulsboro, New Jersey, and also seeks to exclude Schulman and DesAutels' evaluation of the scientific accuracy of Dr. Georgopolous' air modeling report. In addition, and now for the second time, Plaintiff is trying to prop up the deficient opinions of Dr. Georgopolous by adding Dr. Georgopolous' declaration to this Motion.

Plaintiff's motion to exclude Schulman and DesAutels is almost entirely premised upon the declaration by Plaintiff's expert Dr. Georgopolous that acts as improper supplementation to his report. The few criticisms of Schulman and DesAutels' methodology raised by Plaintiff demonstrate an incomplete understanding of the scientific bases for their opinions. Plaintiff's improper assertion that Schulman and DesAutels' methodology is "divorced from reality" has no basis in reality, and Plaintiff's motion should be denied.

II. STATEMENT OF FACTS

Lloyd L. Schulman, Ph.D., is a Principal Scientist in Atmospheric Sciences at Exponent, Inc. He received his Ph.D. in Meteorology from the Massachusetts Institute of Technology and has been designated a Certified Consulting Meteorologist by the American Meteorological Society. For more than 40 years, he has developed, evaluated, and applied air quality models, and his specialty has been air flow and dispersion of pollutants near buildings. He has also helped design field and wind-tunnel studies that produced the data needed for development and model evaluation of other models. Notably, the U.S. Environmental Protection Agency currently recommends a mathematical model that Dr. Schulman co-developed for predicting the concentration of pollutants affected by buildings. He has authored more than 40 publications in journals and conference proceedings and has taught workshops on modeling. Dr. Schulman has also been designated by the American

Meteorological Society as a Certified Consulting Meteorologist.² A copy of Dr. Schulman's curriculum vitae is attached as Exhibit A.

Christopher G. DesAutels is a Managing Scientist in Atmospheric Sciences at Exponent, Inc.³ He received a M.S. in the Geosystems Masters Program from the Massachusetts Institute of Technology. For the past 15 years, he has been involved in the application of air quality models, which includes 8 years of experience applying computational fluid dynamics models to atmospheric issues. He also has 15 years of experience conducting air dispersion modeling using EPA guideline models, including CALMET/CALPUFF, and AERMOD, including modeling of both industrial and mobile sources. He has also conducted Computational Fluid Dynamics (CFD) modeling to understand atmospheric flows and dispersion in complex situations, including spills of flashing and dense gases during rail, transportation, and industrial accidents, cooling tower plume re-circulation, building damage from hurricane force wind speeds, and wind energy applications. Mr. DesAutels is experienced in the use of the FLUENT CFD and Star-CCM+ models for atmospheric modeling and has conducted studies using the OpenFOAM CFD platform. Prior to joining Exponent, he was a Senior Meteorologist at TRC Corporations where he conducted air quality and CFD modeling. This work included validation studies of the FLUENT model for accidental large-scale releases of ammonia and H₂S. He has authored numerous publications in journals and conference proceedings on modeling. A copy of Mr. DesAutels' curriculum vitae is attached as Exhibit "B".

Defendants retained Dr. Schulman and Mr. DesAutels (hereinafter "Schulman", "DesAutels", or "Exponent") to investigate the dispersion of vinyl chloride vapor in and around Paulsboro, New Jersey following the derailment of a Conrail train on the morning of November 30,

² It is noteworthy that Plaintiff has raised no challenge to Dr. Schulman's qualifications in her motion.

³ Plaintiff has also raised no challenge to Mr. DesAutels' qualifications in her motion.

2012, and to address the time history, duration, and magnitude of the concentrations of vinyl chloride in Paulsboro. Specifically, Exponent was retained to: (1) estimate the characteristics of the vinyl chloride release from the tank car; (2) conduct mathematical simulations of the released vinyl chloride as it was transported and dispersed by the wind; and (3) review and critique the March 20, 2015 report prepared by Plaintiff's expert, Panos Georgopolous, Ph.D.

Using a Computational Fluid Dynamics ("CFD") model, Exponent opined that no vinyl chloride was present in the center of Paulsboro until after 8:26 a.m. At that time, the wind shifted and the cloud of vinyl chloride traveled east to west as it passed through Paulsboro, with any given point in Paulsboro within the cloud for roughly only ten (10) minutes. *See, Exponent Report attached as Exhibit C, at 4.* By 9:10 a.m., the vinyl chloride cloud would have moved west of Paulsboro, with vinyl chloride concentrations decreasing over time as the cloud moved west and mixed with the air.

The second portion of Exponent's April 20, 2015 report critiqued Dr. Georgopolous' methodology and his model. With respect to their opinions as to Dr. Georgopolous' model, Exponent found that it failed to properly account for wind speed, speculated with respect to thermodynamics considerations, and did not properly consider terrain variation, all of which caused his model to grossly overestimate Plaintiff's potential exposures to vinyl chloride.

III. LAW AND ARGUMENT

A. Dr. Georgopolous' Declaration Improperly Seeks To Supplement His Initial Report And Should Be Stricken.

In the guise of exposing purported flaws in the critique expressed in Exponent's report, Plaintiff has submitted a declaration by Dr. Georgopolous which attempts to cure the deficiencies of his initial report. Dr. Georgopolous' declaration references numerous citations to scientific articles that Dr. Georgopolous neither cited to, nor arguably considered, in preparing his initial report. Dr.

Georgopolous' declaration buttresses his previous conclusions with a variety of new information that he neither considered nor identified in his report or deposition testimony. For example, Exhibit B to his declaration (although not attached to Plaintiff's Motion to exclude Dr. Schulman and Mr. DesAutels) is an excerpt from a 2009 scientific article by Geiger *et al.* regarding wind currents near the ground- certainly information relevant to Dr. Georgopolous' opinions, but nonetheless not included in his report. A review of both the "List [sic] Documents Reviewed by P.G. Georgopolous" found at page 64 of his Report, and the "Bibliography" found at pages 60-63 of his Report, demonstrate that this citation was not included in his Report. *See*, Def. Mot. at Ex. A at 64; 60-63.

This "declaration", when fairly read, is in actuality a supplemental expert report by Dr. Georgopolous, improperly submitted by Plaintiff without leave of court, which rehashes his methodology and conclusions and criticizes Defendants' experts. It seeks to improperly inject new grounds supporting Dr. Georgopolous' Report and opinions after both his deposition and Defendants' Motion to Exclude him revealed significant flaws in his methodology. Such a tactic unfairly prejudices Defendants and violates both the letter and spirit of this Court's November 13, 2014 Scheduling Order and Fed. R. Civ. P. 26(e).

This Court should strike the declaration of Dr. Georgopolous filed with Plaintiff's Motion to Exclude Schulman and DesAutels on the basis that it constitutes an unauthorized and impermissible supplemental expert report stating new opinions and explanations in response to Defendants' Motion to Exclude Dr. Georgopolous. This new expert report was filed in violation of Rule 26 and this Court's case management order, after the close of discovery, and after Dr. Schulman and Mr. DesAutels' depositions were completed. Filed without leave of the Court, Dr. Georgopolous' declaration improperly attempts to cure glaring deficiencies in his original report by setting forth for

the first time assertions that could have, and should have, been included in his initial report. Plaintiff's failure to include this required material in its disclosure is neither substantially justified nor harmless.

While Fed. R. Civ. P. 26(e) recognizes that parties have an obligation to supplement expert reports in a timely manner if the party learns that in some material respect the report is incomplete or incorrect, such supplemental disclosures are "only for the narrow purpose of correcting inaccuracies or adding information that was not available at the time of the initial report. ..." *Sancom, Inc. v. Quest Comm. Corp.*, 683 F.Supp.2d 1043, 1062-63 (D.S.D. 2010). A supplemental report may be rejected where it is offered to rebut an argument raised in a summary judgment motion, or was served merely because a party simply wished to supplement." *In re Asbestos Liability Lit.*, 289 F.R.D. 424, 425-26 (E.D. Pa. 2013). In addition, "it is not sufficient that opposing parties have the supplemental report in hand now before trial. The intent of the rule is to ensure that deposition testimony can proceed with parties already armed with the expert's report, so as to be able to evaluate the opinions to be offered." *Beller v. United States*, 221 F.R.D. 696, 700 (D.N.M.). To permit such unfettered supplementation "would create a system where preliminary reports could be followed by supplementary reports and there would be no finality to expert reports, as each side, in order to buttress its case or position, could 'supplement' existing reports and modify opinions previously given." *Id.*, at 701. All of this would also interfere with the Court's ability to set case management deadlines, "because new reports and opinions would warrant a new round of consultation with one's own expert and virtually require new rounds of depositions." *Id.*, at 701-02.

Dr. Georgopoulos' declaration is not an attempt to remedy inadvertent factual errors or amend his report based on information not previously available to him. Rather, he is specifically trying to wholesale supplement his opinions as well as fill the numerous gaps in his March 20, 2015

report that were brought to light during his deposition and in Defendants' motion to exclude him. As a result, his declaration should be stricken from the record pursuant to Rule 26(e) and this Court's Scheduling Order of November 13, 2014.

In the absence of Dr. Georgopolous' declaration as support for Plaintiff's Motion to exclude Defendants' experts Schulman and DesAutels, Plaintiff is left with nothing more than unsubstantiated assertions criticizing the methodology of Defendants' experts. Plaintiff's Motion should be denied on that basis as well.

B. Standards For Admission Of Expert Testimony.

"The Rules of Evidence embody a strong and undeniable preference for admitting any evidence which has the potential for assisting the trier of fact." *Kannankeril v. Terminix Int'l Inc.*, 128 F.3d 802, 806 (3d Cir. 1997) (citing *Holbrook v. Lykes Bros. S.S. Co.*, 80 F.3d 777, 780 (3d Cir. 1996)); *see also* Fed. R. Evid. 402 ("Relevant evidence is admissible."). If expert evidence is admissible, the trier of fact will determine the proper weight to give it. *Maloney v. Microsoft Corp.*, 2011 U.S. Dist. LEXIS 127870, at *6-7 (D.N.J. Nov. 4, 2011).

Fed. R. Evid. 702 requires satisfaction of three requirements for admission of expert testimony: "(1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case." As this Court has held, "[t]hese three requirements are often referred to as qualification, reliability and fit." *Poust v. Huntleigh Healthcare*, 998 F. Supp. 478, 490 (D.N.J. 1998). "A district court's inquiry under Rule 702 is 'a flexible one' and must be guided by the facts of the case." *ZF Meritor, LLC v. Eaton Corp.*, 696 F.3d 254, 294 (3d Cir. 2012).

C. Schulman and DesAutels' Methodology and Opinions are Reliable and Fit The Facts Of The Case.

Plaintiff's Motion criticizes the opinions of Defendants' experts Schulman and DesAutels in five main areas. Defendants will address each of these criticisms separately and in detail below.

1. Schulman and DesAutels Properly Accounted for Terrain Variation in Their Model.

Plaintiff asserts in her Motion that Exponent's methodology failed to account for houses, buildings, and trees in Paulsboro, which Plaintiff claims would "trap" the vinyl chloride and delay its movement from Paulsboro, but yet accounted for the 6-foot deep Mantua Creek to model the sheltering of the gas. (Doc. 846-1, at 2). As noted in their report, Exponent's CFD model considered "gravitational slumping and subsequent flow of heavier-than-air gases [vinyl chloride] into low lying areas such as Mantua Creek and surrounding wetlands" and incorporated terrain elevations from the National Elevation Dataset.⁴ Ex. C, at 9. Plaintiff's criticism of Exponent's methodology with respect to terrain is misplaced- Schulman and DesAutels clearly analyzed terrain variation in their model, and Plaintiff's motion to exclude Schulman and DesAutels should be denied.

The logical implication of Plaintiff's argument on this issue is absurd- if Exponent had factored in these obstructions, they would have arguably delayed transport of the vinyl chloride from the area and resulted in even lower concentrations than those estimated by Exponent. Dr. Schulman testified specifically as to that point:

⁴ The National Elevation Dataset (NED), available in the public domain, provides basic elevation information for earth science studies and mapping applications in the United States. Scientists and resource managers use the NED data for global change research, hydrologic modeling, resource monitoring, mapping, visualization, and many other applications. The NED is continually updated to integrate newly available, improved elevation source data. Ex. C, at 6; Ex. D, at 83-86.

Q. If you had been able to account for all of these buildings [houses, trees, large buildings], what difference, if any, would it have made in how your model turned out?

A. I think it would have lowered concentrations.

Q. Why would it have lowered concentrations?

A. Because the presence of obstacles on the ground cause more dispersion, more motion of the air horizontally and vertically. So that as the plume went through Paulsboro after 8:30, it would have had to have been mixed more vertically and horizontally than it would be if there were no buildings there. So that would dilute the plume with ambient air and reduce the concentrations.

...

A. ... the main effect of the structures is the additional mixing or dilution of the plume.

Q. Okay. Why does it not trap the higher concentrations?

A. Well, it- it- it traps concentrations but they bleed off quickly because air is not stagnant. And even when you have a wake behind a structure, it's constantly training air because the wind is moving. In this case, when the plume is going to Paulsboro from the east towards the west and so there's – there's fresh air from above moving into the area which are diluting these concentrations behind the buildings as well. They're not stagnant at that concentration.

Transcript of June 3, 2015 Deposition of Lloyd L. Schulman, attached as Exhibit D, at 96:9-25; 97:1-2; 98:23-25; 99:1-16.

Plaintiff's comments as to Defendants' experts' methodologies are nothing more than a misplaced attempt to justify Dr. Georgopolous' flawed exclusion of Mantua Creek in his model's terrain analysis component. As properly evaluated by Exponent in its methodology, a creek, river or ravine can contain a dense gas for an extended period, and ultimately affect the dispersion of the

gas. Def. Mot. at Ex. D. The critical consideration is not the height of an object in the area where the dense gas could disperse, but rather the nature of the obstruction- a dense gas would be diverted around buildings (such as the 25-foot homes so pointedly referenced by Dr. Georgopolous in his declaration) which would lower concentrations. Ex. C, at 9.

The Mantua Creek channel is a primary driver of the dense gas dispersion in this case and cannot be ignored or dismissed as Dr. Georgopolous did. *Id.* The critical points missed by Georgopolous, but considered and modeled by Exponent, are the settling of the dense gas that is released within the creek channel, and the subsequent sheltering by the wind. Mr. DesAutels' clarified this point during his deposition:

Q. How – does the vinyl chloride—is it sheltered in the creek [Mantua Creek] channel so that it actually doesn’t get into Paulsboro itself?

A. The creek channel is a lower area and the creek banks prevent the dense gas from gravitationally settling into town because they [the vinyl chloride] will follow the lowest areas, like a fluid would.

June 3, 2015 Transcript of the Deposition of Christopher G. DesAutels, attached as Exhibit E, at 19:8-16.

2. *Schulman and DesAutels Properly Accounted for Wind Speed in Their Model.*

Plaintiff’s motion further criticizes Defendants’ experts’ methodology because Exponent uses wind data from “a single spot”- the Philadelphia Airport ASOS observations. (Doc. No. 846-1, at 2). Plaintiff claims that Exponents’ use of this ASOS data, “averaged every two minutes” renders Exponent’s methodology unreliable. (*Id.*) In contrast, Plaintiff notes, as she continues to improperly reference Dr. Georgopolous’ methodology, Dr. Georgopolous used the hourly averaged METAR data from four weather stations. By doing so, however, as noted by Dr. Schulman and Mr.

DesAutels, Dr. Georgopolous mistakenly concluded that the vinyl chloride remained over Paulsboro because there was no prevailing wind.

Plaintiff's invalid assertions on this point merely serve to reinforce Plaintiff's lack of understanding, and perhaps Dr. Georgopolous' lack of meteorological experience with, the ASOS data. The METAR data used by Dr. Georgopolous are in fact a small subset of the ASOS observations used by Exponent in its model- the same ASOS observations Plaintiff criticizes Defendants' experts for using, with two important distinctions: (1) METAR data report winds as calm if the speeds are less than 3 knots while the complete ASOS data show wind speeds in whole knots as low as 1 knot; and (2) METAR rounds wind directions to the nearest 10 degrees while the original ASOS data are reported to the nearest whole degree. Def. Mot. at Ex. D. The METAR data used by Dr. Georgopolous was, in fact, a degraded snapshot version of the ASOS wind data. Each hour, ASOS records 30 different, 2-minute average wind speeds and wind directions, but Dr. Georgopolous only used 1 or 2 of those values, and ignored the remaining 28 or 29 measurements. Def. Mot. at Ex. A. The 1 or 2 2-minute measurements Georgopolous used are not representative of the entire hour period.

Plaintiff's belaboring of the fact that Dr. Georgopolous used the METAR data "from the four weather stations closest to Paulsboro", while Exponent only used ASOS data "*from a single spot*" serves to further underscore the lack of understanding of the very methodology and model employed by Dr. Georgopolous. The implication by Plaintiff's attention to this point is that Dr. Georgopolous' use of four weather stations, rather than the one she criticizes Defendants' experts for using, somehow renders his analysis more accurate and is thus fatal to the methodology of Defendants' experts. However, although Dr. Georgopolous claims that all weather stations he input to the SCIPUFF model were used equally, this should not be the case. SCIPUFF uses a weighted

average to determine the importance of each weather station, with stations closer to the point of interest, i.e. Paulsboro, receiving much greater weight. For example, a station one mile away will have 100 times the influence of a station ten miles away. [CITE] Philadelphia Airport is only two (2) miles away from Paulsboro, while Northeast Philadelphia airport, Wilmington airport, and South Jersey Regional airport, are thirty (30) miles, twenty-five (25) miles, and twenty-nine (29) miles from Paulsboro, respectively. However, because Dr. Georgopolous elected instead to pick and choose one or two data points of the thirty available each hour, his analysis is skewed. In fact, an analysis such as that Dr. Georgopolous professed to employ, which used more distant stations to challenge the representativeness of Philadelphia Airport, runs counter to the inherent assumptions of Dr. Georgopolous' own modeling. The data used by Defendants' experts, taken at the Philadelphia Airport, is by far the most representative weather station for modeling Paulsboro with respect to the wind that would have dispersed the vinyl chloride on November 30, 2012.

Exponent's methodology is not subject to challenge with respect to use of relevant wind speed and direction data, and properly incorporated wind data for the Paulsboro area.

3. *Schulman and DesAutels' Model Properly Adjusted for Wind Instrument Height.*

Plaintiff also argues that Defendants' experts, despite Schulman and DesAutels' intimate expertise with air modeling and all of the various technical factors inherent in such a specialized field, failed to account for the height of the wind measurements used in their analysis. (Doc. 846-1, at 3). Plaintiff's claim that Exponent did not consider that the ASOS data used in their model is recorded at 59 feet above sea level, while Paulsboro is at sea level. *Id.* This assertion by Plaintiff is simply wrong. The CFD model does not assume the wind speed at anemometer height is the same as ground level, and in fact Exponent's model accounts for the anemometer height in its calculations, which are ultimately predicted for 5 feet above local ground elevation. Ex. C, at 9.

Plaintiff fails to point out that the wind observations from Philadelphia Airport, as noted by Defendants above, are in fact representative of Paulsboro because KPHL, like Paulsboro, is in open flat terrain with elevations near sea level. Ex. C, at 5. Plaintiff does correctly note that “[a]s the Exponent experts obviously know, wind velocities are higher at greater heights, and decrease the closer one gets to the ground”, but Plaintiff is unable to make the necessary scientific connections to offset her contradictory assertions on this point. This argument, similar to Plaintiff’s other arguments with respect to Exponent’s methodology, shows a lack of understanding of air quality models.

The most crucial elevation with respect to calculating wind speed and direction is height above ground level, and not height above sea level. As Plaintiff points out, wind speed increases with height above the ground, and not height above sea level. Both the CFD model and the SCIPUFF model reduce the wind speeds (measured at 26 feet above the ground at the Philadelphia Airport) as the height above the ground is reduced. Ex. C, at 5. This is done using a boundary layer profile which is a standard part of air dispersion models. *Id.*, at 9-10.

Additionally, the Delaware River current issue raised by Plaintiff is not relevant because the dense gas was not released over the Delaware River. (Doc. 846-1, at 9). Neither the Delaware River nor Mantua Creek would have had more than a very minor and localized effect on wind speeds or directions. Ex. C, at 179. This argument by Plaintiff is nothing more than a red herring to further distract the Court from the methodological shortcomings of Plaintiff’s expert by claiming that low level wind speeds above the Delaware River or Mantua Creek would have affected the vinyl chloride dispersion- a factor Dr. Georgopolous failed to raise in his March 20, 2015 Report. The fact that Plaintiff, through Dr. Georgopolous’ inappropriate declaration, now make this assertion, “citing authoritative publications” no less (none of which were cited in Dr. Georgopolous’ March

20, 2015 Report), merely highlights the inadequacy and lack of scientific rigor of Dr. Georgopolous' report and testimony, and fails to render this argument relevant to the facts at issue.

Plaintiff also criticizes Defendants' experts on the issue of "prevailing wind. (Doc. No. 846-1, at 3). The conclusion by Dr. Georgopolous of a lack of "prevailing wind" is inaccurate, as previously noted, based upon the barebones wind data Dr. Georgopolous chose to insert into his model. The lack of the same conclusion by Defendants' experts, does not, in fact, render their methodology to be "unscientific", as Plaintiff asserts. Dr. Georgopolous incorrectly concluded that any wind direction was just as likely as any other to affect the vinyl chloride, and it could move in any direction. However, this is counter to the observed data available from the Philadelphia Airport used by Exponent in their modeling. The two-minute ASOS data from KPHL show a persistent wind direction from the southwest and west for the first 30 minutes after the derailment, and then persistent winds from the north for the next 60 minutes. Ex. C, at 11. The incorrect conclusion that any wind was just as likely as any other to move along the vinyl chloride was due to Dr. Georgopolous looking only at a subset of five observations from the available ASOS data, and then solely considering the METAR format of these data which report any speeds below 3 knots as calm. Ex. C, at 12. Dr. Georgopolous should have reached a different conclusion had he used, or perhaps been aware of, all of the available 2-minute averaged ASOS data. A truly close examination of the 2-minute ASOS winds from the Northeast Philadelphia airport, Wilmington airport, and South Jersey Regional airport that Dr. Georgopolous claimed showed a "chaotic" picture in fact show a similar picture of persistent winds that do not blow from the southeast and east until after 8:15 am. However, if only the METAR data, which report calm winds below 3 knots, are examined, this would be missed.

4. *Schulman and DesAutels' Methodology Properly Truncated Wind Speeds.*

Plaintiff next criticizes Exponent's methodology for their addition of 0.5 knots to the ASOS wind speeds as arbitrary and without scientific basis. (Doc. No. 846-1, at 3). As noted by Exponent in their report, ASOS winds "are reported truncated to whole knots, and wind directions are reported to the nearest whole degree" in conformity with EPA recommendations for modeling when using ASOS data. Ex. C, at 5. A wind speed of 2.9 knots or 2.1 knots are both reported as 2.0 knots. Ex. E, at 32. Plaintiff's argument on this point, and Dr. Georgopolous' assertion in his declaration that he is unaware of any literature underlying Exponent's methodology with respect to truncation and addition of 0.5 knots to truncated wind speeds when using ASOS data, is inaccurate. During Mr. DesAutels' deposition, he testified on this specific point:

Q. Is it somewhere in there [the Air Minute Users Instructions- "AERMET"] that says that EPA recommends increasing the wind velocity by 0.5 knots?

A. Yes. There's the notation in here that notes that the winds are truncated, meaning you should increase them by half a knot.

Ex. E, at 30:25; 31:1-7; Ex. C at 15.

In direct contravention to Plaintiff's argument, it would have been "unscientific" for Exponent to ignore the fact that ASOS wind data is reported as truncated, and they did not "simply borrow" the 0.5 knots that were added to the ASOS data in contravention of sound scientific methodology. As noted by DesAutels during his deposition, the AERMET "reads the ASOS data specifically", thus Exponent needed to adjust for the ASOS data truncation accordingly. Ex. E, at 33:21-22. Exponent's methodology on this point is supported by the fact that the EPA adds 0.5 knots to the winds used in their recommended EPA models, noted by DesAutels. Ex. E, at 33; Ex. C, generally. This correction by Exponent was not arbitrary, but rather an obvious mathematical

adjustment to account for the truncation, as illustrated above. The fact that EPA performs this correction does not limit it to EPA models; rather it is a precedent for other scientists on the best manner in which to handle this truncation. Any study using ASOS data should account for truncation, regardless of the model being used, and Exponent's methodology on this point is sound and in complete accord with the facts and data used to prepare their Report.

5. *Schulman and DesAutels' Methodology Properly Accounts for Fog.*

Plaintiff also asserts that Exponent's modeling did not account for fog present in Paulsboro on the day of the derailment. She outrageously contends that Exponent's methodology was "devised in the hope of hoodwinking the jury", and she points to various eyewitness accounts and/or photographs as "proof" of her claim. This assertion flies in the face of Exponent's report and methodology, which discussed the fog and its implications on Exponent's opinions. Plaintiff's plainly unscientific attribution to Dr. Schulman that "where the fog was visible, vinyl chloride was present" misrepresents his testimony. (Doc. No. 846-1 at 5). Dr. Schulman did testify that if the vinyl chloride release caused vinyl chloride "fog" due to the vinyl chloride "reduc[ing] the temperature of the air which reduces it below its dew point which cause condensation which causes fog", it was at least initially possible that there was vinyl chloride present 'in the same area as the fog that it caused.' Ex. D, at 115:3-16. Exponent's methodology accounted for visible fog reported at the derailment, and their Report discusses it. Ex. C, at 8-9. Plaintiff's claim that Exponent's conclusions are "diametrically at odds with the **actual proof**" from photographs and video. (Doc. No. 846-1, at 4; emphasis original). Plaintiff offers no scientific explanation for her assertions, however, and lacks any foundation for the various items she attaches in support of her claim.

Vinyl chloride is not necessary for the production of fog. Ex. D, at 111. There can be fog without vinyl chloride and there can be vinyl chloride in regions without fog. Ex. C, at 8. Despite

Plaintiff's assertions to the contrary, fog is not an absolute indication that vinyl chloride was present, and is an imprecise way to determine where vinyl chloride was or was not transported. Ex. D, at 117. Even assuming that some vinyl chloride might be transported in a similar manner as the fog, the photographs can be explained by Exponent's model. All of the photographs showing fog in Exhibit F to Plaintiff's Motion are either looking eastward over the Mantua Creek, or represent locations adjacent to the creek. Fog over the creek and to the east over the wetlands is expected because: (1) natural fog is produced by the mixing of water vapor over the creek and wetlands with the overlying air; and (2) the denser-than-air vinyl chloride residing in the creek during those times could cause fog, or enhance the natural production of fog in the hour or so after sunrise. Ex. C, at 8-9; Ex. D, at 146-147.

Vinyl chloride on the west side of the creek, but restricted to less than 200 feet from the shore, was predicted by the Exponent model a few minutes after the release (7:03 am) and could explain a report of fog "going towards Delaware Street". Ex. D, at 141. After 7:30 am, the winds shifted to a more northerly direction and the Exponent model shows the vinyl chloride plume less than about 100 feet onshore in several isolated locations south of the release. Ex. C. At 8:22 am, only 8 minutes after the final photograph in Exhibit F to Plaintiff's Motion, the model shows the vinyl chloride plume at the intersection of Commerce and Broad Streets and quickly moving inland. *Id.* The few minutes' discrepancy is within the accuracy of the observations being considered. Ex. D, at 142-143.

Thus, assuming the fog present in all of the photographic evidence Plaintiff offers in support of her claim that Exponent's methodology is scientifically unsound because it failed to consider the unscientific proposition that the presence of fog was somehow indicative of the presence of vinyl chloride, Exponent's model is in fact consistent with all the photographs in Exhibit F. Exponent's

model shows that the penetration of the vinyl chloride plume into Paulsboro beyond some isolated areas along the creek does not occur until after 8:22 am. Plaintiff's additional claim that Exponent "ignored or dismissed" radio transmissions from first responders is also unscientific. Exponent's methodology was performed without reference to extraneous information such as this, and in these observations actually support Exponent's model- which moves back toward town as it progressed.

Dr. Schulman testified as such:

Q. So if there's a report of a lot of smoke going towards Delaware Street at 7:11 a.m., would that be inconsistent with your model?

A. No.

Q. Why not?

A. The first few minutes after the release our model does show vinyl chloride concentrations moving a couple hundred feet over towards Delaware Street from the incident site.

Ex. D, at 139:17-25; 140:1-2.

IV. CONCLUSION

For the reasons set forth above, Plaintiff's motion to exclude the report and testimony of Dr. Lloyd G. Schulman and Christopher G. DesAutels should be denied.

Respectfully Submitted,

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CERTIFICATE OF SERVICE

I hereby certify that on this 20th day of July, 2015, a copy of the within Memorandum of Law in Opposition to Plaintiff's Motion to Exclude the Expert Report and Testimony of Schulman and DesAutels was served on all counsel of record via e-file.

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